

SYLLABUS OF SECOND PROFESSIONAL M.B.B.S.

- (A) GENERAL PATHOLOGY
- (B) PHARMACOLOGY AND THERAPEUTICS
- (C) FORENSIC MEDICINE AND TOXICOLOGY
- (D) BEHAVIOURAL SCIENCES

(Syllabus published with the curriculum of first professional M.B.B.S. Part-I and II).

(A) GENERAL PATHOLOGY

CELL INJURY

1. Necrosis, Ischemia, Hypoxia, Infarction and Gangrene
Oncosis and Autolysis.
2. Sequence of the ultrastructural and biochemical changes which occur in the cell in response to the following:
 - Ischemia
 - Immunological injury, e.g., Asthma / SLE / Anaphylactic reaction
 - Physical agents, e.g., Radiation
 - Genetic defects, e.g., Thalassemia / Hemophilia
 - Nutritional deficiency, e.g., Kwashiorkor
 - Infectious agents
 - Viruses, e.g., Hepatitis
 - Bacteria, e.g., Staphylococcus aureus
 - Fungi, e.g., Candida
 - Parasites, e.g., Malaria
 - Nutritional deficiency
3. Irreversible and reversible injury
4. Apoptosis and its significance.
5. Necrosis and its types
6. Exogenous and endogenous pigmentation.
7. Dystrophic and metastatic calcification along with clinical significance.
8. Metabolic disorders
 - Lipid disorders, Steatosis of liver, Hyperlipidemia
 - Protein disorders
 - Carbohydrate disorders

INFLAMMATION, MEDIATORS OF INFLAMMATION

1. Role of inflammation in the defense mechanisms of the body.
2. Vascular changes of acute inflammation and their relation to morphological and tissue effects.
3. Process of Chemotaxis, Opsonization and Phagocytosis.
4. Role of cellular components in inflammatory exudate.
5. Exudates and transudate.
6. Important chemical mediators of inflammation.
7. Pathway of Arachidonic Acid metabolism.
8. Role of products of Arachidonic acid metabolism in inflammation.
9. Mechanism for development of fever, with reference to exogenous and endogenous pyrogens.
10. Chronic inflammation including Granulomas.
11. Granuloma and its types along with causes.
12. Systemic effects of acute and chronic inflammation and their possible outcomes.
13. Significance of ESR.
14. Induced hypothermia in medicine.
15. Healing in specialized tissue.

WOUND HEALING

1. Repair and regeneration.
2. Wound healing by first and second intention.
3. Factors that influence the inflammatory reparative response.
4. Wound contraction and cicatrisation.
5. Formation of granulation tissue.
6. Complications of wound healing.

DISORDERS OF CIRCULATION

a. Thrombo-embolic disorders and their modalities

1. Etiology and pathogenesis of thrombosis.
2. Possible consequences of thrombosis
3. Difference between thrombi and clots
4. Classification of emboli according to their composition.
5. Difference between arterial and venous emboli.

b. Hemorrhage, Hyperemia and Congestion

1. Definitions of common types of Hemorrhage
2. Types of hyperemia
3. Difference between hyperemia and congestion

c. Infarction

1. Types of infarction
2. Difference between anemic and hemorrhagic infarct
3. Morphological picture of infarction in different organ systems

d. Disorders of the circulation and shock

1. Edema, ascites, hydrothorax and anasarca.
2. Pathophysiology of edema with special emphasis on CHF.
3. Pathogenesis of four major types of shock (Hypovolemic, cardiogenic, vasovagal & septic) and their causes.
4. Compensatory mechanisms involved in shock.

MICROBIOLOGY

1. Defence mechanisms of the body.
2. Microbial mechanisms of invasion and virulence.
3. Difference between sterilization and disinfection.
4. Methods of disinfection and sterilization of the following:
 - a. Facility where the doctor practices,
 - b. Examination table,
 - c. Any spillage e.g. sputum, vomitus, stool, urine, blood,
 - d. Examination tools, e.g., thermometer, nasal and ear specula and spatula,
5. Principles of aseptic techniques such as Venepuncture, urinary catheterization, bandaging, suturing and lumbar puncture.
6. Universal precautions for infection control.
7. General principles of the following serological tests:
 - a. ELISA – Hepatitis (A,B,C,D,E,G) Rubella, CMV and HIV
 - b. PCR
 - c. Haemagglutination – TPHA
 - d. Western Blot –HIV
Malaria.
8. Interpretation of :
 - a. Culture reports
 - b. Serological reports and
 - c. Microscopic reports of gram stain and ZN stain.
9. Principles of proper collection and submission of specimens for laboratory investigations
9. General characteristics and taxonomy of Bacteria, Rickettsia, Chlamydia, Viruses and Fungi.
11. Communicable, Endemic, Epidemic, and Pandemic Diseases, Carriers Pathogens, Opportunists, Commensals and Colonizers.
12. Microorganisms responsible for infection of the following organ systems:
 - Central Nervous System
 - Respiratory System
 - Gastrointestinal System
 - Genital System
 - Urinary System
 - Infections of Bones and Joints
 - Zoonosis
 - Infection of the Skin
 - Hepatic Infections

13 Pathogenesis, Treatment, Epidemiology, Prevention and Control of the following organisms:

(i) **Bacteria**

Staphylococcus aureus

Streptococcus pneumoniae

Beta hemolytic streptococcus group a & b

Diphtheria sp.

Bordetella sp.

Bacillus anthracis

Clostridium perfringens

Clostridium botulinum,

Clostridium difficile

Clostridium tetani

Actinomyces israelii

Nocardia asteroides

Neisseria meningitidis

Neisseria gonorrhoeae

Gardnerella vaginalis

Haemophilus influenzae

Mycobacterium tuberculosis

Mycobacterium leprae

E.coli

Klebsiella

Proteus

Salmonella

Shigella

Yersinia pestis

Pseudomonas

Vibrio cholera

Vibrio parahaemolyticus

Campylobacter jejuni

Helicobacter pylori
Legionella
Mycoplasma pneumoniae
Chlamydia
Treponema pallidum
Leptospira
Rickettsia sp.

(ii) Viruses

Mumps
Herpes
Measles
Influenza,
Para influenza
RSV
Hepatitis A, B, C, D, E
Rota
CMV
EBV
Rubella
Chicken Pox
HIV
Rabies

(iii) Fungus

Cryptococcus neoformans
Candida albicans
Tinea species

(iv) Protozoa

Plasmodium species
Giardia lamblia
Entamoeba histolytica

Cryptosporidium
Leishmania species
Trichomonas vaginalis
Toxoplasma gondii
Pneumocystis carinii

(v) Helminths

Ascaris lumbricoides
Ancylostoma duodenale
Trichuris trichuria
Enterobius vermicularis
Filaria species
Strongyloides stercoralis
Schistosoma species
Echinococcus species
Taenia solium
Taenia saginata
Hymenolepis nana

PRINCIPLES OF ANTI MICROBIAL ACTION.

1. Antibiotics, selective toxicity, bacteriostatic and bactericidal.
2. Host determinants in relation to selection of an antimicrobial drug for therapy.
3. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC)
4. Bacterial resistance and the mechanisms involved in acquiring bacterial resistance
5. Mechanisms involved in transfer of drug resistance to bacterial resistance.
6. Mode of action of various antimicrobial drug groups.
7. Superinfection and cross sensitivity.

LIST OF COMMON ORGANISMS CAUSING ORGAN SYSTEM EFFECTS

a. Common organisms causing CNS Infections

(i) **Bacteria**

Streptococcus pneumoniae

Beta hemolytic streptococcus group b

Neisseria meningitidis

Haemophilus influenzae

Mycobacterium tuberculosis.

E.coli

Listeria monocytogenes

(ii) **viruses**

Enterovirus

Mumps

Herpes

Adenovirus

(iii) **fungus**

Cryptococcus neoformis

- (iv) **protozoa**
 - Malaria
 - Toxoplasma

B. Common organisms causing respiratory tract infection

(i) bacteria:

- Streptococcus pneumoniae
- Beta hemolytic streptococcus group b
- Diphtheria sp.
- Bordetella sp.
- Haemophilus influenzae
- Mycobacterium tuberculosis
- Klebsiella
- Legionella
- Mycoplasma pneumoniae

(ii) viruses

- Herpes
- Adeno virus
- Measles
- Influenza
- Para influenza
- Rhinovirus
- RSV

(iii) protozoa

- Pneumocystis carinii

C. Organisms causing gastrointestinal tract infection / infestation

(i) Bacteria

Clostridium difficile
Mycobacterium tuberculosis
Salmonella
Shigella
Vibrio cholera
Vibrio parahaemolyticus
Campylobacter jejuni
Helicobacter pylori

(ii) Viruses

Hepatitis A
Rota
Astro

(iii) Fungus

Cryptococcus neoformis

(vi) Protozoa

Giardia lamblia
Entameba histolytica
Cryptosporidium

D. Common organisms causing hepatic infections

(i) Bacteria

Streptococcus species
Coliforms
Anaerobes

(ii) Viruses

Herpes
Hepatitis A, B, C, D, E
CMV
EBV

(iii) Protozoa

Entameba histolytica

Tape worms

Echinococcus granulosus

E. Common organisms causing skin infection

(i) bacteria

Staphylococcus aureus

Streptococcus pyogenes

Actinomyces israeli

Nocardia asteroides

Mycobacterium tuberculosis

Mycobacterium leprae

Corynebacterium diphtheriae

(ii) viruses

Herpes

Measles

Rubella,

Chicken pox

Moluscum contagiosum

(iii) fungus

Candida albicans

Tinea species

(iv) arthropodes

Sarcoptes scabiei

Pediculus species

Cinex lectularius

(v) helminths

Filaria species

Strongyloides stercoralis

Schistosoma sp.

(vi) protozoa:

Leishmania species.

f. Common organisms causing bone and joint infection

Bacteria: Staph aureus, Streptococcus pyogenes, Haemophilus influenzae, Neisseria gonorrhoeae, Brucella melitensis, Salmonella typhi, Strep. pneumoniae, Pseudomonas sp. and Mycobacterium tuberculosis.

g. Common organisms causing genital infection

- (i) **Bacteria:** Mycoplasma urealyticum
- (ii) **Viruses:** Pox, Herpes, Hepatitis B, HIV
- (iii) **Fungus:** Candida albicans
- (iv) **Arthropodes:** Sarcoptes scabiei
- (v) **Protozoa:** Trichomonas vaginalis

h. Common organisms causing zoonosis

- (i) **Viruses:** Rabies,
- (ii) **Protozoa:** Toxoplasma gondii, Leishmania sp.
- (iii) **Helmenthics:** Echinococcus sp.

GENETICS

1. Common sex linked, autosomal recessive and autosomal dominant disorders.
2. Common genetic mutations.
3. Diseases associated with consanguineous marriages.
4. Molecular biology techniques.

GROWTH DISORDERS/NEOPLASIA

1. Atrophy and Hypertrophy, Agenesis, Dysgenesis, Aplasia, Hypoplasia, Hyperplasia, Metaplasia, Dysplasia, Neoplasia, Anaplasia,.
2. Cell cycle and cell types (stable, labile, permanent)
3. Mechanisms controlling cell growth
4. Classification systems of tumors.
5. Characteristics of benign and malignant tumors
6. Difference between Carcinoma and Sarcoma.
7. Grading and staging system of tumors.
8. Biology of tumor growth
9. Process of carcinogenesis
10. Host defense against tumors.
11. Mechanism of local and distant spread.
12. Local and systemic effects of tumors.
13. Tumor markers used in the diagnosis and management of cancers.
14. Common chemical, physical agents and viruses related to human cancer.
15. Epidemiology of common cancers in Pakistan.
16. Radiation and its effects on tissues.
17. Cancer screening.

IMMUNOLOGY

1. Antigen, antibody, epitope, hapten and adhesion molecules.
2. Difference between innate and acquired immunity.
3. Structure and function of major histocompatibility complex (MHC).
4. Cytokines.
5. Mechanism of humoral and cell mediated immunity.
6. Hypersensitivity reactions, Type I, Type II, Type III and Type IV.
7. Autograft, homograft, allograft and xenograft.
8. Immunotolerance and immunoparalysis.
9. Mechanism involved in allograft rejection and steps that can be taken to combat rejection.
10. Classification of Immunodeficiency disorders
11. Basis of autoimmunity.
12. Tissue transplantation.
13. Pathology and pathogenesis of AIDS.
14. Lab diagnosis of immunological diseases.

RECOMMENDED BOOKS

1. **Pathological Basis of Disease** by Kumar, Cortan and Robbins, 7th Ed., W.B. Saunders.
2. **Medical Microbiology and Immunology** by Levinson and Jawetz, 9th Ed., Mc Graw-Hill.
3. **Medical Genetics** by Jorde, 3rd Ed., Mosby.
4. **Clinical Pathology Interpretations** by A. H. Nagi

B. PHARMACOLOGY AND THERAPEUTICS

The course outline is as follows:

1) General Pharmacology:

1. Definition of pharmacology, objectives of learning pharmacology, definition of drug and drug nomenclature.
2. Branches/divisions of pharmacology.
3. Sources of drugs.
4. Active principles of drugs and pharmacopoeias.
5. Dosage forms and doses of drugs.
6. Route of drug administration.
7. Absorption of drugs and processes involved in drug absorption.
8. Factors modifying absorption of drugs.
9. Transport of drugs across cell-membrane.
10. Bio-availability, its clinical significance and factors affecting bio-availability.
11. Drug reservoirs, distribution and redistribution of drugs, plasma protein binding.
12. Pro-drug, bio-transformation of drugs, enzyme induction, enzyme inhibition and entero-hepatic circulation.
13. Plasma half-life of drugs, steady state concentration, its clinical importance and factors affecting it.
14. Excretion of drugs.
15. Mechanism of drug action.
16. Dose response curves, structure-activity relationship.
17. Factors modifying action and doses of drugs.
18. Pharmacokinetics, pharmacodynamics and receptors.
19. Pharmacogenetics.

2) Dermatological and topical drugs (Locally Acting Drugs)

- Demulcents, emollients, irritants, counter irritants, astringents. Antiseborrhoeics, locally acting enzymes.
- Antiseptics and disinfectants.
- Ectoparasiticides.

3) Drugs Acting on Gastrointestinal Tract:

- Emetics and anti emetics.
- Drugs affecting motility of GIT.
- Ulcer healing drugs.
- Purgatives/ laxatives.
- Antidiarrhoeals.

4) Cardiovascular Drugs

- Antiarrhythmic drugs.
- Inotropic drugs.
- Antihypertensive drugs.
- Thrombolytics/ anticoagulants/ antiplatelets.
- Antihyperlipidemic drugs.
- Anti-anginal drugs.
- Drug management of CCF.

5) Diuretics

6) Autocoids

7) Drugs Acting on Autonomic Nervous System Cholinergic Drugs.

- Choline esters.
- Anticholine-esterases cholinomimetic alkaloids.

Anti-cholinergic drugs

- Anti muscarinic
- Anti nicotinic

Sympathomimetics / adrenergic drugs:

- Catecholamine
- Non catecholamine

Sympatholytics/antiadrenergics

- Alpha adrenergic receptor blockers.
- Beta adrenergic receptor blockers

Adrenergic neuron blockers

Autonomic ganglionic blockers

Skeletal muscle relaxants

A) neuromuscular blocking agents - d-tubocurarine, suxamethonium, etc.

B) central muscle relaxants , meprobamate, mephenesin, diazepam, etc.

8) Central Nervous System

- a. Sedative-hypnotics.
- b. Anti-epileptics.
- c. General anaesthetics.
- d. Local anesthetics.
- e. Drugs for movement disorder/ muscle relaxant.
- f. Alcohol.
- g. Drugs for migraine.
- h. Stimulants of the central nervous system:
 - Caffeine, theophylline, theobromine
 - Brain stem stimulants: picrotoxin, nikethamide.
 - Ethamivan, doxapram.
 - Spinal cord stimulants: strychnine.
- i. Psychopharmacology:
 - Anti-psychotics.
 - Anxiolytics.
 - Anti-depressant / anti mania drugs.
 - Alcohol and drugs of abuse.
 - Anti-parkinson drugs.
 - Anti epileptic drugs

9) Analgesics

- a. Opioids and narcotics analgesics.
- b. Nonsteroidal anti inflammatory drugs (nsaid).
- c. Antigout drugs.

10) Drugs Acting on Respiratory System

- a. Drugs used in treatment of bronchial asthma.
- b. Expectorants.
- c. Mucolytics.
- d. Antitussives.

11) Drugs Acting on Endocrine System

- a. Pituitary-hypothalamic drugs.
- b. Adrenocorticoids.
- c. Sex hormones
- d. Thyroid/ parathyroid drugs.
- e. Pancreatic hormones and oral anti diabetic drugs.
- f. Oral contraceptives and anabolic steroids.

12) Drugs Acting on Uterus

- a. Ergometrine.
- b. Terbutaline.
- c. Dinoprostone.
- d. Carboprost.
- e. Ritodrine.

f. Oxytocin.

Antimicrobial Drugs

- a. Sulfonamides.
- b. Penicillins.
- c. Cephalosporins.
- d. Aminoglycosides.
- e. Tetracyclines.
- f. Macrolides:
Chloramphenicol.
- g. Quinolones.
- h. Anti- tuberculous drugs.
- i. Antileprosy drugs.
- j. Anti fungal drugs.
- k. Antiviral drugs.
- l. Anti-protozoal drugs:
 - Anti- malarial drugs.
 - Anti-amoebic drugs.
- m. Urinary tract antiseptics.
- n. Anti cancer drugs.
- o. Immunosuppressive agents.
- p. Miscellaneous.
- q. Vaccines and immunoglobulin drug interaction.

PRACTICALS

A - EXPERIMENTAL PHARMACOLOGY

Experiments designed to observe the action of drugs on animals and isolated tissue.

Experiments on the actions of selected drugs to be demonstrated to the students.

1. Effects of drugs on reflex time.
2. Effects of drugs on frog's heart in situ.
3. Effects of drugs on rabbit's eye.
4. Effects of Acetylcholine and Atropine on isolated rabbit's ileum.
5. Effects of histamine and antihistamines on isolated rabbit's ileum.
6. Schemes to find out unknown drug having stimulatory or inhibitory effect on isolated rabbit's ileum.
7. Effects of neuromuscular blocking agents on frogs rectus abdominus muscle.
8. Methodology of clinical trials.
9. Introduction to Biostatistics.

B. PRESCRIPTION WRITING

General principles

- General principles
- Guideline for rational use of drugs
- Prescription writing for common ailments
 - Acute watery diarrhea
 - Bacillary dysentery
 - Amoebic dysentery
 - Ascariasis
 - Tape-worm infestation
 - Acute streptococcal pharyngitis
 - Iron deficiency anemia
 - Allergic rhinitis
 - Scabies
 - Acute malarial fever
 - Cerebral malaria
 - Typhoid fever
 - Bronchial asthma
 - Hypertension
 - Migraine
 - Cardiac failure
 - Shock

Clinico-Pharmacological Seminars on Rational Drug Therapy and Drug Interaction should be conducted

Antibiotics:

Frequency distribution of antibiotic prescribed in different clinical settings/units.
Rational prescribing pattern of antibiotics.

Parameters: provisional diagnosis, investigation, empirical therapy. Prescribing after culture and sensitivity.

Vitamins:

Parameters

Groups of vitamin prescribed.

Vitamins prescribed on basis of therapeutic indication or empirical.

Single / multiple vitamins

Frequency of prescribing and rational use of vitamins/ otherwise.

Analgesics

Parameters

- a. Frequency distribution of various groups of analgesic prescribed.
- b. Single / multiple drug prescription.
- c. Non specific indications of analgesic prescription.

Adverse Drug Reactions

- a. Anti-microbials, Cytotoxic drugs , Steroids etc.

RECOMMENDED BOOKS

1. **Basic and Clinical Pharmacology** by Katzung, 10th Ed., Mc Graw-Hill.
2. **Pharmacology** by Champe and Harvey, 2nd Ed., Lippincott Williams & Wilkins.

C. FORENSIC MEDICINE & TOXICOLOGY

The course outline is as follows :

1. FORENSIC MEDICINE

a) Pakistan's Legal System:

The powers and jurisdiction of courts, procedures for inquest, and legal procedures. Important legal terms. Application of relevant Legal Sections of the Penal Code. The role of a medical doctor in the medico-legal system. To give Medical evidence in courts. Document information to be prepared by a medical doctor for legal procedures. Procedure of court attendance and recording of evidence.

b) Forensic Sciences:

Role of Forensic Sciences in crime detection.

c) Law in relation to medical men:

Privileges and obligations of Registered medical practitioner. Doctor-patient relationship in the context of the highest ethical standards. Temptations to professional misconduct. Guarding professional secrets and privileged communication. Maintaining highest ethical principles in medical examination and when obtaining consent. Medical negligence. Declaring Brain death, using the highest ethical and biological principles for the decision. The pros and cons of organ transplantation in each individual case.

Develop and defend a personal moral view on Artificial insemination, Therapeutic abortions, Euthanasia, Biomedical research etc. in keeping with the norms of society and highest ethical principles.

d) Personal Identity

Parameters of personal identity, methods of identifying living, dead, decomposed, mutilated and burnt bodies, and skeletal and fragmentary remains, using special techniques (Dentistry Radiology, Neutron Activation Analysis etc.), and objective methods of identification (Osteometry, Dactyloscopy, D.N.A. Technique, Super imposition photography, etc.) Describe the role of various blood groups in resolving paternity and maternity disputes. Methods to determine time since death.

Methods of determination of age, sex and race by various methods with their medico-legal aspects.

Methods to trace evidence, Locard's Principle of exchange and its medico-legal significance.

e) Thanatology

Scientific concepts regarding death, medico-legal aspect of brain death, indicators of death, medico-legal aspects of sudden and unexpected deaths, causes, manner, mode and mechanisms of death.

Physicochemical changes subsequent to death occurring in various body tissues and organs under various environmental conditions.

To write a certification of death according to W.H.O guidelines.

f) Traumatology

i) *Mechanical Injuries*: Mechanisms of wound production, classification of wounds, wounds produced by conventional weapons and their medico-legal aspects. Firearms, ammunition, classification, nomenclature, wound ballistics and medico-legal aspects.

li) *Mechanical injuries medicolegal considerations*: Laws in relation to causing bodily harm, wounding and homicide.

- Examination of an injured person, certify nature, manner of injury, causative agent and dating of wounds.
- Link Sequelae of trauma to its original cause and search for the relationship of sequelae to pre-existing disease.
- Causes of death from wounds.
- Difference between ante-mortem and post-mortem wounds.
- To diagnose whether death is suicidal, homicidal or accidental.

lii) The student should also have knowledge of and be able to describe methods of treatment and possible etiologies of regional injuries, and should be able to suture simple superficial wounds of:

Head (scalp, skull, brain) and face, vertebral column and its contents, neck, chest, abdomen, limbs, bones and joints.

and

Special trauma such as transportation injuries, police torture, and

Death in custody

and

Should be able to determine the medico-legal aspects of heat, cold, electrical injuries.

g) Violent deaths due to asphyxia

Anatomical, physiological, biochemical and pathological signs of violent death and of mechanical, chemical and environmental asphyxia and their medico-legal implications. Death due to drowning.

h) Autopsy:

- Types, objectives, rules, and techniques and describe procedure for postmortem.
- Methods for assessment of fatal period and postmortem interval. Post-mortem artifacts. Risks and hazards of autopsy, and autopsy protocol.
- Procedure for selection and preservation, labeling and dispatch of biological and non-biological materials for laboratory examination; and collection of relevant samples.
- Exhumation procedures, and their value and limitations.

i) Forensic Sexology.

Virginity, pregnancy and criminal processes during delivery, their medico-legal aspects, examination procedure and reporting.

j) Sexual offences and relevant sections of law (Zina and Hudood Ordinance)

- Natural and unnatural sexual offences. Medical examination of victim and assailant, collection of specific specimens and writing a required certification.
- Common sexual perversions and their cause.

k) Miscarriage

Medico-legal aspects applicable to miscarriage examining mother and aborted material.

Sending aborted material in proper preservative for examination.

l) Crime against new born, infants and child:

Infanticide, and criminal and non-accidental violence or abuse to a newborn, infant or child.

m) Forensic Psychiatry

- To diagnose mental illness.
- To distinguish between true and feigned insanity.
- To advise on procedure of restraint of the mentally ill, Limitations to civil and criminal responsibilities of mentally ill.

n) Examination of biological specimens

- Forensic importance of biological specimens (blood, semen, saliva, vomitus, breath, urine, hair),
- The method of their collection, preservation, dispatch and the common laboratory tests performed.

2. TOXICOLOGY

a) General principles of Toxicology

- The scope of Toxicology.
- To access the laws regulating drugs and noxious products.
- Common Toxicants in our environments and their abuse.
- Cause of drug dependence, the fate and detoxification of poisons in the biological tissues.
- To diagnose toxicological cases in acute and chronic exposure in living and dead. Utilize general principles of treatment with antidotal therapy and management.
- To handle specimens, work within the framework of duties of Doctor in cases of poisoning to prepare and interpret chemical examiners reports.

b) Autopsy techniques with collection, preservation and dispatch of biological material to analytical laboratory.

c) Specific Poisons

Poisons/drugs of abuse prevailing in our society along with medico-legal aspects:

- i) Alcohol
- ii) Opiates, opioids and other narcotics
- iii) Salicylates and paracetamol
- iv) Hypnotics and sedatives
- v) Stimulants (cocaine), cannabis
- vi) Poisonous plants (aconite, belladonna, hyoscyamus, stramonium, digitalis, ergot, mushrooms, nux vomica, oleander, tobacco)
- vii) Venomous insects (snakes)
- viii) Inorganic elements, antimony, arsenic, lead, mercury, phosphorus
- ix) Volatile poisons and corrosives (carbon monoxide, hydrocarbons, cyanides, sulfuric acid, oxalic acid, carbolic acid and alkalis)
- x) Pesticides, herbicides and insecticides

Forensic Medicine

- a) Oral
- b) Practical
- c) Note book

Toxicology

- a) Oral
- b) Practical
- c) Note book

Learning Methodology:

Recommendations are as under:-

- A) Theory in the form of tutorials, seminars, videos and lectures
- B) Practical in the form of :
 - Demonstrations
 - Posting in autopsy rooms
 - Postings such as in medico-legal clinics / casualty departments / poison centers.
 - Experiments in biological laboratory.
- C) Visits.
- D) Periodical tests will provide feedback to the teachers and assess adequacy of learning.

Practical work will include

1. In Forensic Medicine
 - Autopsies
 - Medico-legal examination of injured
 - Estimation of age and forensic radiology
 - Sexual assaults and sex related cases (impotence, pregnancy etc.).
 - Procedure of preservation, dispatch of biological and other evidentiary material.
 - Practical in biological laboratory (identification of blood, semen, saliva, etc.).
 - Procedure of consent taking and medical certification.

2. In Toxicology, students should have an understanding of and be able to describe :
 - Diagnostic and management process (alcohol, narcotics and insecticide poisons).
 - Collection, preservation and dispatch of biological materials.
 - Visual, olfactory and tactile identification of common poisons found in communities and country.

3. Visits

For proper orientation and practical demonstration, visits are also suggested to a :

- Court.
- Forensic science laboratory.
- Psychiatric unit or jail
- Site during conduction of exhumation.

RECOMMENDED BOOKS

1. **Simpson's Forensic Medicine** by Barnard Knight, 11th Ed., Edward Arnold, London.
2. **Parikh's Text book of Medical Jurisprudence, Forensic Medicine and Toxicology** by C.K. Parikh 6th Ed., CBS Publisher.
3. **Buchanan's Text book of Forensic Medicine and Toxicology** by Buchanan, 9th Ed., Livingstone.
4. **G. Principles and Practice of Forensic Medicine** by Prof. Nasib R. Awan.
5. **Medical Jurisprudence and Toxicology** by Dr. Siddique Hussain.